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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,597	08/30/2000	Donald C Englin	RA 5221 (33012/290/101)	1146

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EXAMINER

VITAL, PIERRE M

ART UNIT

PAPER NUMBER

2188

DATE MAILED: 11/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/651,597

Applicant(s)

ENGLIN ET AL.

Examiner

Pierre M. Vital

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed December 18, 2000 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Specification

2. The abstract of the disclosure is objected to because of the following informalities: in line 8, replace "give" with --given--. Correction is required.
3. The disclosure is objected to because of the following informalities:
In the Cross Reference to Co-pending Applications, the Serial No. and filing dates of these co-pending applications are missing.
On page 12, line 16, replace "data path logic 70" with --data path logic 68--.
On page 15, line 5, replace "write" with --right--.
Appropriate correction is required.

Claim Objections

4. Claims 1, 3-5, 7, 8, 13-15, 17 and 20 are objected to because of the following informalities: delete "a." from the claims since only one step is involved.
5. In claim 16, line 16, replace "tag1" with --tags--.
Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 1, 6-7, 11 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by FU (US6,457,087).

As per claims 1 and 6, Fu discloses a data processing system having a system bus {i.e., bus 224} and having a processor with a level one cache memory {i.e., CPU 220 can include a L1 cache} responsively coupled to a level two cache memory {i.e., L2 cache memory} which is responsively coupled to a level three memory {i.e., main memory} [Fig. 5A, col. 7, lines 27-36]; said level two cache memory having cache storage {i.e., L2 cache memory 222} and tag storage {i.e., L2 tag memory 226} [Fig 5A], and having a circuit for SNOOPing said system bus [col. 16, lines 7-17], the improvement comprising a first dedicated path between said system bus and said cache storage {i.e., L2 cache memory 222 has direct path to bus 224} and a second dedicated

path between said system bus and said tag storage (*i.e.*, *L2 tag memory 222 has direct path to bus 224*) [Fig. 5A].

As per claim 7, Fu discloses a data request transferred from said level one cache memory to said level two cache memory [col. 6, lines 38-41].

As per claim 11, Fu discloses the claimed invention as detailed per claim 1 above. Fu further discloses formulating a SNOOP request [col. 16, line 11]; presenting said SNOOP request on said system memory bus to said level two cache memory (*i.e.*, *broadcasting snoop requests to cache lines associated with tag memory 326*) [col. 16, lines 11-13]; routing said SNOOP request directly to said tag memory (*tag memory 326 can includes a set of tags*) [col. 16, lines 11-15]; processing said SNOOP request [col. 16, lines 13-17].

As per claim 16, Fu discloses the claimed invention as detailed per claims 1 and 11 above. Fu further discloses caching data in the next level when said data does not reside at the lower level cache [col. 6, lines 38-48].

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2-4, 8-10, 12-13 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu (US6,457,087) and Stevens et al. (US5,426,765).

As per claims 2, 12 and 17, Fu discloses the claimed invention as detailed above in the previous paragraphs. However, Fu does not specifically teach a control logic which provides the highest priority for a SNOOPing as recited in the claims.

Stevens et al. disclose the concept of a control logic which provides the highest priority for a SNOOPing [col. 4, lines 23-32].

It would have been obvious to one of ordinary skill in the art, having the teachings of Fu and Stevens et al. before him at the time the invention was made, to modify the system of Fu to include a control logic which provides the highest priority for a SNOOPing because it would have provided minimal effect on system speed by allowing the cache system to efficiently service its local processor while also guaranteeing access to all snoop requests on the host bus to maintain cache coherency [col.4, lines 15-20] as taught by Stevens et al.

As per claim 3, Fu discloses a level two cache memory further comprising a duplicate tag memory {i.e., *L2 duplicate tag memory 234*} [Fig. 5A].

As per claim 4, Fu discloses a data processing system comprising a plurality of instruction processors [col. 4, lines 53-55].

As per claims 9, 13 and 19, Fu discloses a data processing system comprising a level one tag memory located within said level one cache memory {i.e., *L1 tag memory 246*} [Fig. 5C], a level two cache memory further comprising a duplicate tag memory which maintains a duplicate of information within said level one tag memory {i.e., *L2 duplicate tag memory 234*} [Fig. 5A].

As per claims 10 and 20, Fu discloses a data processing system wherein a snoop request is responsively coupled to said duplicate tag memory [col.15, 48-51, col.16, 7-8].

As per claim 14, Fu discloses routing said SNOOP request to said duplicate tag memory {*tag memory 326 can include duplicate tags*} [col. 16, lines 11-15].

As per claim 15, Fu discloses processing said SNOOP request regarding said duplicate tag memory [col. 16, lines 13-17].

As per claim 18, Fu discloses means responsively coupled to a level two caching means for bussing system memory data [col. 7, line 66 - col. 8, line 5]; means responsively coupled to a bussing means for interfacing said bussing means directly to a storing means [col. 7, lines 37-39]; means responsively coupled to said bussing means for interfacing said bussing means directly to said maintaining means [Fig. 24, element 361, col. 22, lines 54-62].

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fu (US6,457,087) and Stevens et al. (US5,426,765) as applied to claims 1-4 above, and further in view of Duncan et al. (US6,353,877).

As per claim 5, Fu discloses the claimed invention as detailed above in the previous paragraphs. However, Fu does not specifically teach a data processing system comprising a level three cache memory as detailed in the claim.

Duncan discloses a data processing system comprising a level three cache memory [col. 6, lines 28-31].

It would have been obvious to one of ordinary skill in the art, having the teachings of Fu and Stevens et al. and Duncan before him at the time the invention was made, to modify the system of Fu and Stevens et al. to include a data processing system comprising a level three cache memory because it would have provided higher processor performance by reducing the period of time that the processor must wait to retrieve data and instructions from the main memory by temporarily storing large portions of data in the third level cache [col. 6, lines 32-35] as taught by Duncan.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111 (c) to consider these references fully when responding to this action. The documents cited therein teach multilevel cache memory and prioritizing snoop request over processor request.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pierre M. Vital whose telephone number is (703) 306-5839. The examiner can normally be reached on Mon-Fri, 8:30 am - 6:00 pm, alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (703) 305-3821. The fax phone numbers for

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the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-9000.

Reginald G. Bragdon

REGINALD G. BRAGDON
PRIMARY EXAMINER

Pu

Pierre M. Vital
October 31, 2002